

Applicant : William A. Sirignano
Appl. No. : 10/766,132
Examiner : Sarah Sachie Clark
Docket No. : 703538.4032

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

1. (currently amended) A miniature combustor comprising:

a combustion chamber having first and second ends,

~~a liquid fuel inlet into the chamber,~~

a gas inlet formed in a first end of the chamber, and

a means for forming a stable liquid film on the combustion chamber's interior surface to reduce the combustion heat losses to ~~a~~ the combustion chamber's wall to avoid flame quenching, the means including liquid fuel injectors injecting fuel onto the interior surface of the combustion chamber,

wherein the chamber having a lateral dimension transverse to a major flow direction within the chamber that is sub-centimeter, and whereby a flame is sustainable within the interior of the combustion chamber.

2. (original) The combustor of claim 1 wherein the lateral dimension is in a range of about 1.0 to 3.0 millimeters.

3. (original) The combustor of claim 1 wherein the chamber is generally cylindrical.

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4. (original) The combustor of claim 1 wherein the length of the chamber is in a range of about 1.0 to 10.0 centimeters.

5. (original) The combustor of claim 1 wherein the liquid-fuel inlet comprises a fuel injector oriented to eject fuel onto a surface within the chamber.

6. (original) The combustor of claim 1 wherein the liquid-fuel inlet comprises at least a portion of a chamber wall formed of a porous material.

7. (currently amended) The combustor of claim 1 wherein ~~the liquid fuel inlet the~~ means for forming a stable liquid film comprises a plurality of orifices.

8. (currently amended) The combustor of claim 7, wherein the ~~means for forming a~~ ~~stable liquid film liquid fuel injectors~~ comprises a plurality of liquid fuel injectors, each coupled to one of the plurality of orifices and oriented tangentially to a wall of the chamber and orthogonally to the major flow direction within the chamber.

9. (original) The combustor of claim 8 wherein the plurality of liquid fuel injectors comprise first and second set of injectors wherein the first and second set of injectors are symmetrically opposed about the chamber.

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10. (previously presented) The combustor of claim 1 wherein the means for forming a stable liquid film comprises a swirl generator.

11. (original) The combustor of claim 10 wherein the swirl generator comprises a swirl positioned within the chamber adjacent the first end.

12. (original) The combustor of claim 10 wherein the swirl generator comprises a plurality of gas inlets tangentially coupled to the chamber adjacent the first end of the chamber.

13-14. (cancelled)

15. (currently amended) A combustion process comprising the steps of injecting liquid fuel into a combustion chamber, wherein the chamber has a lateral dimension transverse to a major flow direction within the chamber that is sub-centimeter, forming and maintaining a stable liquid fuel film over substantially an entire interior surface of the chamber to reduce the combustion heat losses to a chamber wall to avoid flame quenching,
injecting an oxidizing gas into the chamber, and
burning an oxidizing gas and fuel mixture within the chamber.

16. (cancelled)

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17. (currently amended) The method of claim 16 ~~wherein the liquid is further comprising injecting an inert liquid and the fuel mixture comprises a gaseous fuel.~~

18. (cancelled)

19. (previously presented) The method of claim 15 further comprising the step of swirling the oxidizing gas.

20. (original) The method of claim 15 wherein the step of forming and maintaining a liquid film over substantially an entire interior surface of the chamber, includes reducing combustion heat losses to walls of the chamber.

21. (original) The method of claim 15 wherein the step of injecting an oxidizing gas includes injecting the oxidizing gas axially into the chamber and swirling the axially in-flowing gas by passing it through a swirl generator positioned adjacent to an inlet of the chamber.

22-25. (cancelled)